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GROUP 55

HEATER, AIR CONDITIONER AND VENTILATION

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GENERAL INFORMATION

M2551000100759

For the heater and A/C system, the heater, the blower and the cooling unit are integrated as one unit to reduce weight and size. For A/C system, the manual A/C has been adopted.

FEATURES

IMPROVEMENTS IN COMFORT

- Adoption of low noise, large air volume heater and A/C system
- Adoption of smaller air intake box for larger passenger leg space.
- Optimising the areas of the outside air induction hole and the air outlet improves ventilation performance as well as the quietness of the room
- Adoption of clean air filter with deodorant function for cleaner air in the compartment.

IMPROVEMENTS IN OPERATION PERFORMANCE

- Inside/outside air selection switch has been changed to a pushbutton switch.
- Improved operation ability by the enlarged tab on the dial knob
- Air amount and temperature only are controlled automatically for easier operation. <Vehicles with automatic A/C>

RELIABLE VISUAL FIELD (IMPROVEMENT IN SAFETY)

- Current type defroster nozzle has been adopted to improve defogging performance (Shortens windshield fogging time).
- Defroster vents have been integrated to secure better defogging pattern.
- Black coin drop prevention ribs are used on the defroster to prevent its reflection on the windshield, providing sufficient field of vision for safety

IMPROVEMENTS IN FUEL ECONOMY

- Wider condenser area reduces load to the A/C and improves fuel consumption.
- Energy conservation control using outside air temperature sensor is adopted for vehicles with manual A/C as well.
- A small-size, highly-efficient compressor has been adopted.
- Simpler wiring and weight reduction are achieved by installation of CAN communication system

GLOBAL ENVIRONMENT PROTECTION

Adoption of HFC134a for refrigerant.

IMPROVEMENTS IN SERVICE QUALITY

- Reduction of refrigerant gas leakage and improvement in serviceability by incorporating condenser and receiver
- The layout of refrigerant line for better workability is adopted.

RESPONSIBILITY IMPROVEMENT

Reliable information transmission is achieved by connecting A/C-ECU and each ECU via CAN communication.

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SPECIFICATION

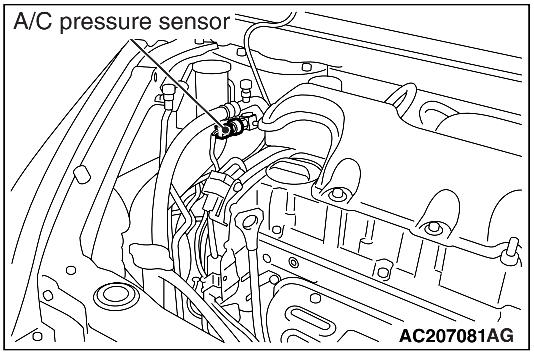
Item		Specification
Heater unit type		Two-layer full blow air mix method
Heater control type		Dial type
A/C switch type		Push button type
Compressor type		MSC60CA
Refrigerant	Type	HFC134a
	Charge quantity g	550 ± 20

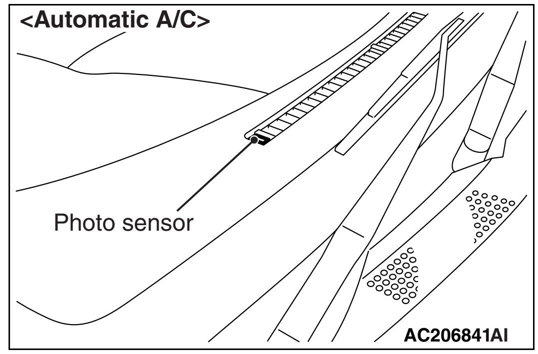
PART MANUFACTURER

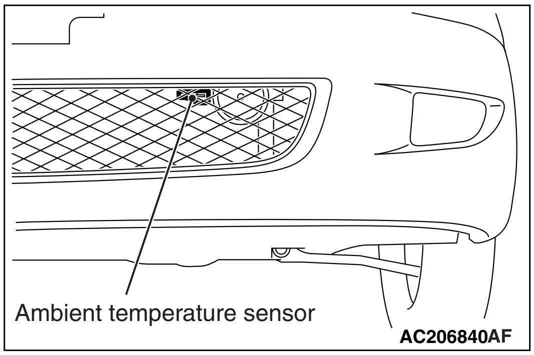
Item	Manufacturer
A/C controller amplifier	Mitsubishi Heavy Industries Ltd.
Liquid pipe A	
Liquid pipe B	
Discharge flexible hose	
Suction flexible hose	
Compressor	
Heater control panel	Ansei Co., Ltd.
Heater unit	Denso Corporation
Air intake box	
Condenser	Zexel Valeo Climate Control Corporation

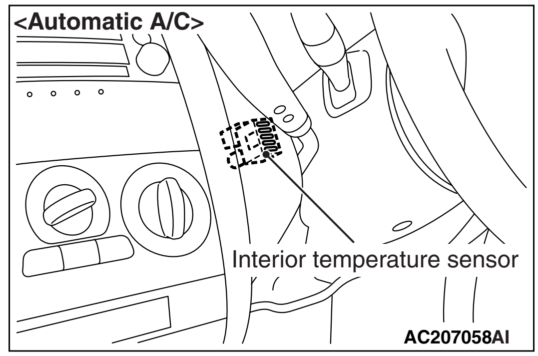
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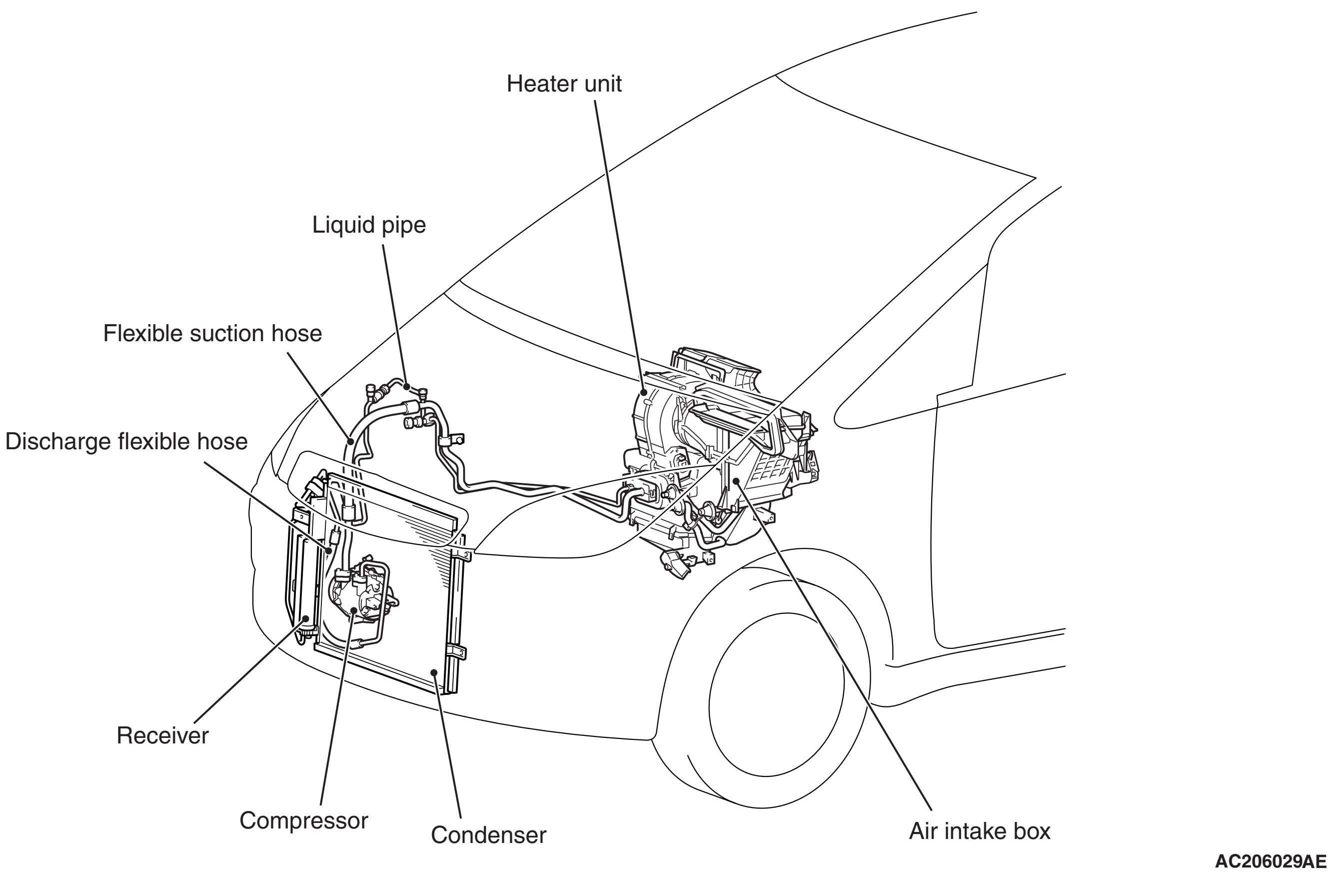
CONSTRUCTION DIAGRAM











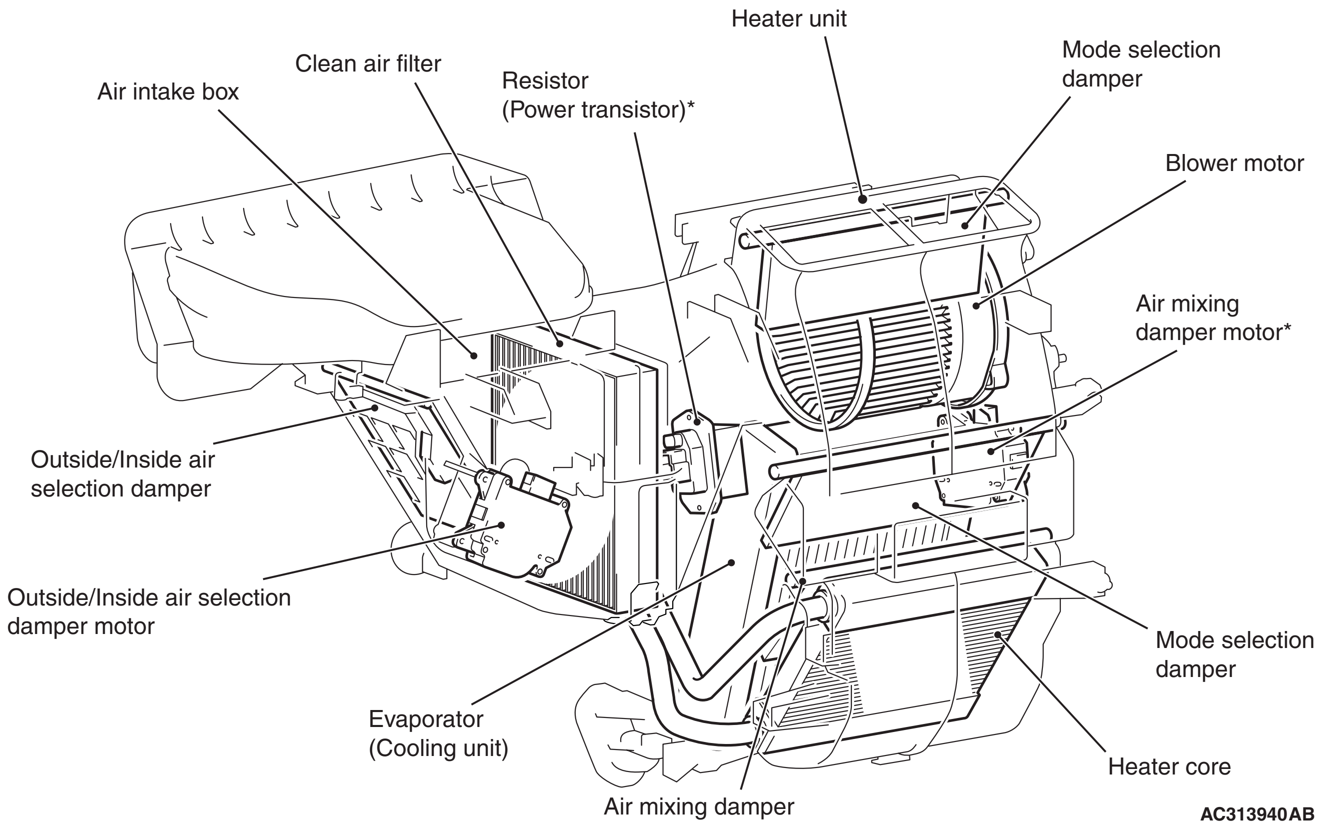
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HEATER UNIT

M2551000800219

COOLING UNIT AND HEATER UNIT



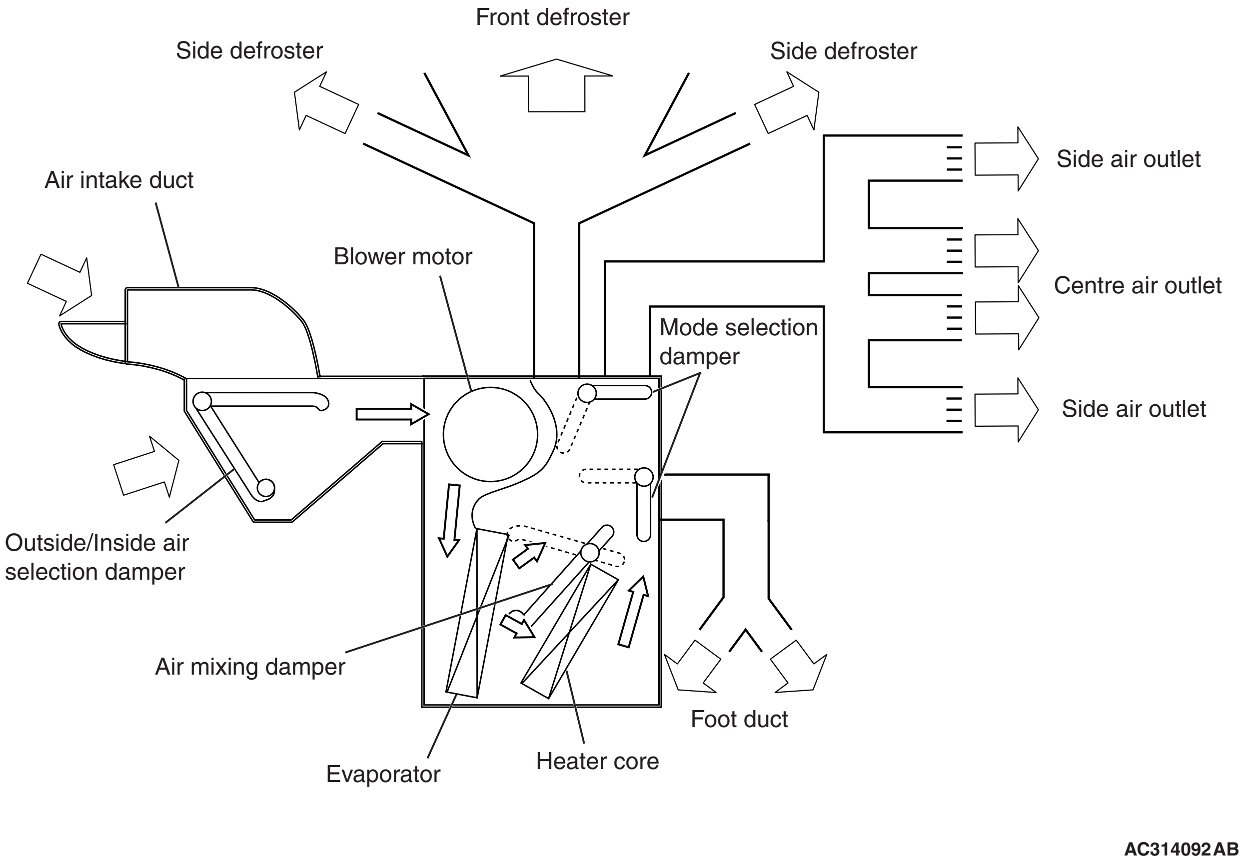
*NOTE: *: Indicates vehicles with automatic A/C.*

The following cooling unit and heater unit have been installed for greater fan power, reduced noise, and improved A/C performance.

- The heater unit integrates the heater, blower, and cooling unit for reduced weight and size.
- Smaller air intake box has been adopted for larger passenger leg space.
- The case has a crushable structure so as to be crushed when a collision occurs, thereby protecting passengers from impact and improving the safety.
- Reheating of heater is minimised to reduce A/C load, thereby improving fuel consumption.
- Clean air filter with deodorant function is installed for higher comfort. <Vehicles with automatic A/C>

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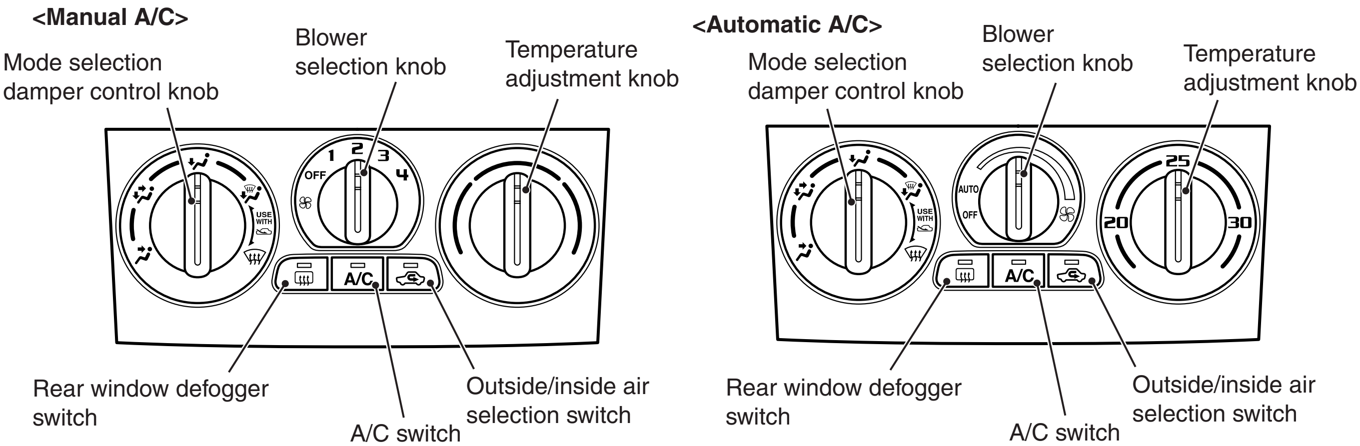
OPERATION



HEATER CONTROL

M2551000900346

HEATER CONTROLLER



AC206985AE

The heater control offers the following features for improved appearance and operationability and easier visual recognition.

- Improved appearance by incorporating the centre panel
- Large rotary control to improve controllability
- Outside/inside air selection switch has been changed to a pushbutton switch for easier operation.
- Easier visual recognition through larger display labels
- Graphic display is added to the mode label to encourage simultaneous usage of the outside air mode when the defroster is used.
- Adoption of rear window defogger switch with timer of 20-minute range.

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A/C-ECU

M2551001200179

CONTROL SYSTEM

The manual and automatic A/Cs have the following control functions.

Control	Manual A/C	Automatic A/C
Automatic wind temperature change control	Applicable	Applicable
Automatic outside/inside air selection control	Applicable	Applicable
Idle-up control	Applicable	Applicable
Cooling fun load control	Applicable	Applicable
Cooling control	Applicable	Applicable
Detection control for refrigerant leaks	Applicable	Applicable
MAX A/C control	Not applicable	Applicable
Estimation control for compressor torque	Applicable	Applicable
Defroster linked control	Not applicable	Applicable

AUTOMATIC CHANGE CONTROL OF BLOW WIND TEMPERATURE (COMPRESSOR ENERGY-CONSERVATION CONTROL)

Optimum ON/OFF control of the compressor is achieved according to the outside/inside air mode, air temperature (air temperature sensor), and insulation.

OUTSIDE/INSIDE AIR AUTO SWITCHING CONTROL

When the A/C is turned on in high ambient temperature, the recirculation function is automatically activated to cool down the passenger compartment and improve fuel consumption.

COOLING FUN LOAD CONTROL

Depending on the A/C load, the cooling fan cycle time is controlled and the exterior noise in the intermediary stage is decreased. Also, the load of the alternator is decreased to improve the fuel economy.

COOLING CONTROL

If air temperature is high, the CVT rotates at a high speed to prevent deterioration in cooling performance.

DETECTION CONTROL FOR REFRIGERANT LEAKS

When it is judged from the air temperature (air temperature sensor) and the refrigerant pressure (A/C pressure sensor) that the refrigerant amount is the specified value or less, or the refrigerant pressure is abnormal, the compressor is forced to be cut off to protect the A/C system.

MAX A/C CONTROL <VEHICLES WITH AUTOMATIC A/C>

When MAX COOL position is set, automatically the mode is changed to the inside air mode before the A/C is turned ON, thereby facilitating the operation for obtaining maximum cooling performance.

ESTIMATION CONTROL FOR COMPRESSOR TORQUE

Communication between the engine·CVT-ECU and A/C-ECU is made to control the engine according to the compressor torque for higher drivability and reduction in fuel consumption.

FORCIBLE DEFROSTER CONTROL <VEHICLES WITH AUTOMATIC A/C>

When the defroster vents are selected, the A/C is automatically turned ON. At this time, the outside/inside air selection damper is operated to the fresh-air position to defrost the windshield glass quickly.

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COMMUNICATION

The A/C receives the following kinds of signals through CAN communication.

Signal	Transmitter ECU
Engine coolant temperature signal	Engine-CVT-ECU <CVT> or Engine-ECU <M/T>

NOTE: . For further details on CAN, refer to GROUP 54C, CAN *P.54C-2**.*

DIAGNOSTIC FUNCTION

Code No.	Diagnostic item	Service data display contents when diagnosis code is set
B1011	Ambient temperature sensor system (short circuit)	20°C
B1012	Ambient temperature sensor system (open circuit)	
B1021	Air thermo sensor system (short circuit)	–6°C
B1022	Air thermo sensor system (open circuit)	
B1082	Automatic/manual types abnormal error	–
U1073	Bus off error	–
U1100	Engine-CVT-ECU time-out	
U1101		
U1102	ABS-ECU time-out	
U1106	EPS-ECU time-out	
U1109	ETACS-ECU time-out	
U1120	Failure information on engine-CVT-ECU (related to engine)	
U1206	Flag invalid	

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SERVICE DATA OUTPUT

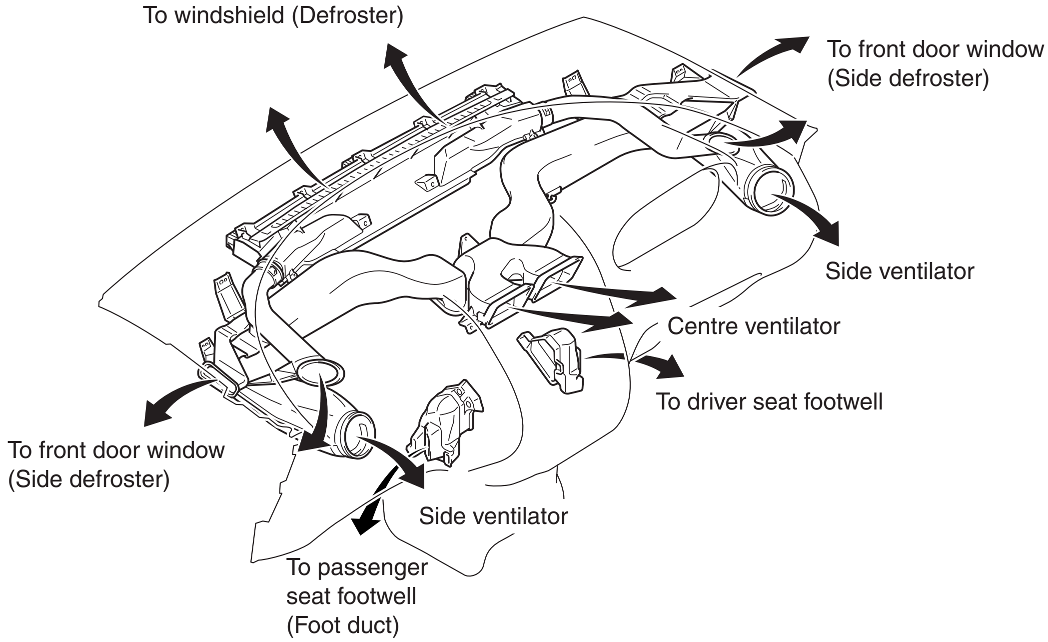
Item No.	Check items
02	Ambient temperature sensor
03	Air thermo sensor
04	A/C pressure sensor
05	Water temperature sensor
07	Set temperature
08	Set temperature (control part set value)
15	Outside/Inside air selection damper
20	Blower motor
21	Blower motor (Target)
30	A/C switch
31	A/C switch (control part set value)
35	Rear window defogger switch (control part set value)
36	Blower switch
37	Outside/Inside air selection switch
40	Abnormal low pressure judgement
41	Refrigerant leaks judgement
42	DEF position flag
43	Forcible DEF position flag
44	Forcible DEF DRY flag

ACTUATOR TEST

Item No.	Check items
30	Outside/Inside air selection damper control motor
31	
40	Rear defogger switch
41	
09	Condenser fan
0B	
50	Idle-up requirement
51	
52	

DUCTS

M2551001300110



AC313959AB

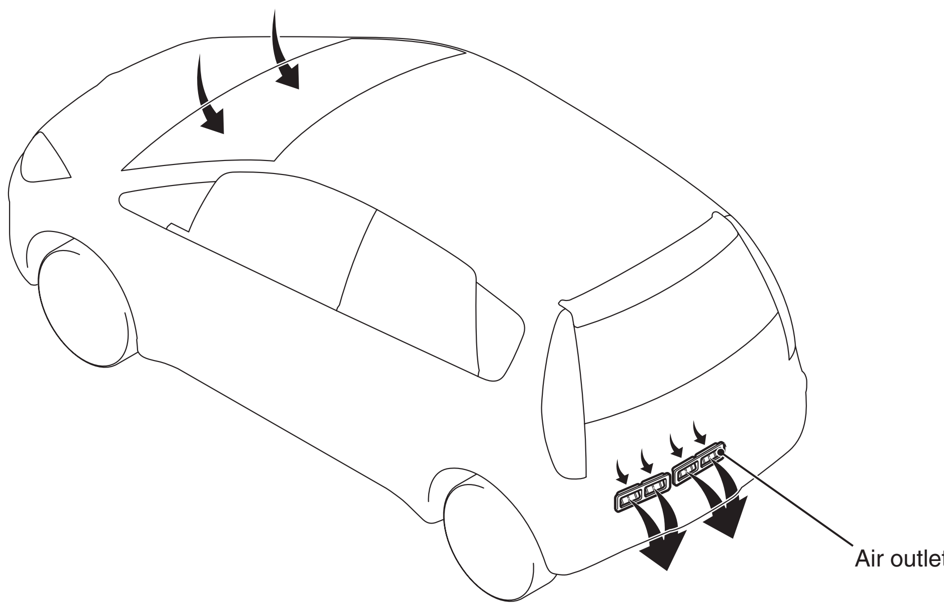
Adopting the flow-speed type defroster and the unified heater system allows the ventilation system with high defogging performance. In addition, the air outlet of defroster is so located as not to be viewed from the front seats, thereby improving the room appearance.

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VENTILATION SYSTEM

M2551002000305



AC206030AB

Fresh air is drawn from the front deck, and extracted from air outlet located behind the rear bumper. Areas of fresh air intake hole and air outlet ventilation have been optimised in order to improve air volume (ventilation performance) while securing cabin quietness.